

(11) Publication number: **0 628 492 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **94304041.0**

(51) Int. Cl.⁵: **B65D 43/06, // B65D101/00**

(22) Date of filing: **06.06.94**

(30) Priority: **10.06.93 GB 9311980**

(43) Date of publication of application:
14.12.94 Bulletin 94/50

(84) Designated Contracting States:
BE DE FR NL

(71) Applicant: **THURGAR BOLLE LIMITED**
Telford Way
Kettering, Northants NN16 8UY (GB)

(72) Inventor: **Mayes, Robert Henry**
10 Spinney Rise
Denford/Kettering/Northamptonshire (GB)
Inventor: **Bell, Robert Graham**
137 Wellingborough Road
Finden/Northamptonshire (GB)

(74) Representative: **Pidgeon, Robert John**
Appleyard Lees
15 Clare Road
Halifax West Yorkshire HX1 2HY (GB)

(54) **Tamper evident container closure.**

(57) A container having an effective tamper-evident means has a container body whose rim defines an upwardly-open channel 8, and a lid with a downwardly dependent skirt 24 received within the channel. The inner surface of the skirt has a step portion 28 which co-operates with a step portion 26 within the channel, to prevent relative movement of skirt and channel. The skirt can only lift from the channel once a tamper-evident portion 12 provided along a portion of the rim of the container body has been displaced.

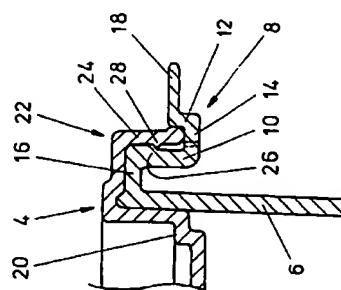


FIG. 2

EP 0 628 492 A1

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EP 0 628 492 A1

2

This invention relates to a tamper-evident container.

Many types of tamper-evident container have been proposed, all having the common aim of enabling a consumer to see that access has been gained to the contents of a container, before the consumer has opened the container for the first time.

There have been various problems with earlier tamper-evident containers. In some, it has been possible to remove the lid of the container and access the contents, without disturbing the tamper-evident means. In others, the tamper-evident means has been such as to make it difficult for the consumer to open the container. Yet other proposals have been overly complicated and expensive.

It is an object of the invention to produce a tamper-evident container which is not overly expensive, and which is effective in preventing unauthorised access to the container before the consumer has first opened it, whilst not making it difficult for the consumer to open the container, for the first time or subsequently.

In accordance with the present invention there is provided a container having an upwardly open container body and a lid, the container body having an upwardly open channel around its rim, defined by an inner upright wall, an outer upright wall and a lower connecting wall, the lid having a downwardly depending skirt adapted to locate within the channel wherein, around at least a portion of the channel there is a weak zone by means of which a tamper-evident portion of the outer wall may be broken off or permanently displaced, the skirt then being accessible, and displaceable outwardly, wherein the outer surface of the inner wall of the channel, and the inner surface of the skirt, have co-operating means which prevent the skirt from rising out of the channel, other than when the skirt is accessible following the breaking off or permanent displacement of the tamper-evident portion.

The co-operating means may extend around the entire rim of the container. Alternatively, the co-operating means may extend only around a portion, or a plurality of discrete portions, of the rim. In containers which are of non-circular cross-section and which may be said to have "corners", the co-operating means preferably do not extend around the corners, but only along the regions therebetween.

The co-operating means may suitably comprise inter-engaging step portions formed on the outer surface of the inner wall and the inner surface of the skirt. Preferably, at least one of the step portions has a face which is at a slant angle to the inner wall and the skirt, such that the step portion of the skirt can slide over the step portion of the inner wall, to become disengaged therefrom, by upward and outward displacement of the skirt, once it has become accessible, following the breaking off or permanent displacement of

the tamper-evident portion.

Preferably the tamper-evident portion extends only along a small proportion of the rim. However, in some embodiments it can extend around the entire rim. When the container can be said to have "corners", as in a container of generally square or rectangular section, the tamper-evident portion may suitably be located around at least one corner region. In this region the co-operating means are preferably not provided, in order for the lid to be relatively easily removed, once the tamper-evident portion has been disabled.

Preferably, the tamper-evident portion comprises a tab which extends outwardly from the outer wall. The tab enables a user to obtain some leverage to assist the breaking-off or permanent displacement of the tamper-evident portion and furthermore, in those preferred embodiments in which a tamper-evident portion extends only around a part of the rim, denotes, to the consumer, the portion to be broken off or permanently displaced.

Preferably, the inner and outer walls are substantially parallel to one another. Preferably, the inner wall and the outer wall are substantially vertical, in the normal upright position of the container. The skirt is preferably substantially vertical and snugly locates between the inner and outer walls.

Preferably, the weak zone is formed such that the tamper-evident portion is not immediately broken off, when the consumer wishes to open the container for the first time. Rather, it is arranged such that the tamper-evident portion hangs from the rim by a residual web of material. It is arranged thus because such tabs which immediately break free from a container can do so with the release of elastically stored energy, which causes them to fly off, for example into food. Leaving a web of material means that the tamper-evident portion can be left in place. However, if it is removed, for example by tearing it off or cutting it, there is no release of elastically stored energy, which can cause it to fly off.

Preferably, the weak zone is defined by a line of perforations.

The tamper-evident container in accordance with the present invention is highly effective in preventing unauthorised access to the contents of a container, before a consumer has opened it for the first time. Because of the presence of the outer wall, a blade cannot be slid between the bottom of the skirt, and the connecting wall of the channel. Because of the co-operating means between the inner wall and the skirt, the skirt cannot move directly upwards, to leave the channel, before the tamper-evident portion has been broken off or permanently displaced.

The invention will now be further described, by way of example, with reference to the accompanying drawings in which;

Fig. 1 shows, in a first embodiment, a container

3

EP 0 628 492 A1

4

body of a stackable container in accordance with the present invention, in plan view;

Fig. 2 is a view along section AA, shown in Fig. 1;

Fig. 3 shows a container body of a second embodiment, in plan view;

Fig. 4 is a more detailed view, corresponding to that of Fig. 3, of the corner region having the tamper-evident portion;

Fig. 5 is a cross-section through the corner region shown in Fig. 4;

Fig. 6 is a cross-section of the rim region of the container body of Figs. 3-5, taken medially, equidistant from corners of the container body;

Fig. 7 is a cross-section taken through the lid of the container of Figs. 3-6, taken medially, in correspondence to the cross-section of Fig. 6;

Fig. 8 is a cross-section through a corner region of the lid, in correspondence to the cross-section of the container body shown in Fig. 5; and

Fig. 9 is a cross-section in a medial position, corresponding to the cross-sections of Figs. 6 and 7, showing the lid closing the container body.

The container of the first embodiment, shown in Figs. 1 and 2, is of generally square section, comprising an upright container body 2, and a lid 4, both these parts being plastics mouldings.

The container body has main upright walls 6, extending upwardly from a bottom wall. Around the rim of the container, at the top of the upright wall 6, there is an upwardly open channel 8. The upwardly open channel 8 is defined by an inner wall 10, a shorter outer wall 12 and a lower, horizontal, connecting wall 14, joining the lower edges of the inner and outer walls 10, 12. The inner wall 10 is joined to the main wall 6 by a horizontal connecting wall 16.

Extending laterally outwardly from the upper edge of the outer wall 12, in one corner only, is a web 18. Also in this corner, and in this corner only, the connecting wall 14 is formed with perforations, indicated by dotted lines in Figs. 1 and 2, defining a weak zone, extending between weak end zones 19 of thin wall thickness. The tamper-evident portion comprising tab 18, and the adjoining portions of outer wall 12, and the connecting wall 14, are able to be snapped downwardly. The perforations are arranged such that a web remains at one end of the tamper-evident portion, so that the tamper-evident portion hangs down, rather than snaps off completely. If it is desired to remove the tamper-evident portion, the tag and the adjoining weakened end zone 19, must be torn through.

The lid 4 is formed with a downwardly facing channel 22 which, when the lid is placed on the container body, embraces the upper part of the walls 6, the connecting wall 16, and the inner wall 10. The outer wall of the downwardly facing channel 22 is a depending skirt 24 which locates within the channel 8, snugly between the inner wall 10, and the outer wall

12, with its lower edge against the connecting wall 14.

The outer surface of the inner wall 10 is formed with a step portion 26, having a step face angled upwardly and outwardly, at about 45° to the vertical. Co-operating with this is a step portion 28, formed as the inner surface of the skirt 24, also angled upwardly and outwardly, at about 45° to the vertical. In this embodiment the step portions extend around the entire periphery of the container body and of the lid. The step portions co-operate such that the skirt cannot leave the channel 8 by direct upward movement. Should an attempt be made to do this (if the lid can even be gripped, so as to apply an upward force), the step faces are such that the skirt would tend to move outwards; but this is prevented by the abutment of the base portion of the skirt, against the outer wall 12 with the channel 8.

To remove the lid for the first time, it is necessary first to break off or permanently displace the tamper-evident portion in one corner of the container, with the aid of the tab 18. The tab 18 denotes to the consumer what has to be broken off, and serves as a lever, to assist the consumer.

Once the tamper-evident portion has been broken off or permanently displaced, the user can grasp the skirt in that region and displace it outwardly and upwardly, so that the faces of the step portions 26 and 28 slide past each other. The plastics materials are sufficiently flexible that once this has been achieved in the corner region which had the tamper-evident portion, it can be continued around the rest of the rim, even though the rest of the rim still retains the outer wall 12 of the channel.

If preferred, however, the tamper-evident portion may extend around a major part of the rim, or around the whole of the rim. If desired more than one tamper-evident portion may be provided. For example, one may be provided at each corner.

The second embodiment will now be described with reference to Figs. 3 to 9.

Again, the container is of generally square section, albeit with rounded "corners". As shown in Fig. 3 a tamper-evident portion 30 is provided at one corner only and comprises a tab 32. It should be noted that at one end of the tab only there is provided a cut-through 34. There is no cut-through or weakened zone at the other end. This means that when the tab is displaced it is not broken off, but left hanging. This feature is important in the food industry where it is an important object to minimise the likelihood of incorporation of foreign bodies into food.

It should be noted that the container body provides four discrete step portions 36, extending between the corners, but not being taken around the corners. This means that, whilst the co-operation means defined by the step portions on the container and lid serve their purpose in preventing unauthorised removal of the lid when the tamper-evident por-

tion is in its initial condition, once the tamper-evident portion has been displaced the conformations to not make it unduly difficult to remove the lid. In trials it has been found that it can be difficult to remove the lid in some embodiments in which the conformations are extended around the corners.

As shown in Fig. 4, small bridges 38 of material are provided between the tamper-evident portion and the rest of the rim region. Large perforations are provided between the bridges 38 of material.

As shown in Fig. 5, the rim of the container body at a corner comprises an outer wall 44 extending downwardly from the tab 32, a longer inner wall 46, and a lower, horizontal connecting wall 48. The container body wall 50 is connected to the channel by a horizontal connecting wall 52. It will be observed, as mentioned previously, that the channel of the container body, at the corner, is provided with no step portion. Such step portions are only provided in the regions between the corners, as shown in Fig. 6. The step portion 53 shown in Fig. 6 comprises upper and lower ramp surfaces, respectively inclined at 75° and 15° to the horizontal.

The lid is provided with step portions 64 in locations corresponding to those of the step portions 53 on the container body. That is to say, the step portions on the rim are not extended around the corner regions. In contrast to the first embodiment, the step portions of the second embodiment do not have inclined surfaces. The step portions are defined by horizontal surfaces, with a vertical surface therebetween. The rim region of the lid comprises an outer wall or skirt 54, an inner wall 56 and a horizontal, upper, connecting wall 60. The step portion 64 is carried on the inner surface of the skirt 54.

Fig. 8 serves to confirm that the corners of the lid have no step portions, so aiding removal of the lid once the tamper-evident portion has been removed. Another difference is that the lower region of the inner wall terminates in an inclined surface 66, aiding replacement of the lid, rather than a stepped portion, present between the corners, as shown in Fig. 7.

Fig. 9 shows the lid engaged with the container body, with the respective step portions inter-engaged. This embodiment shows that the main wall of the container body has a shoulder. The purpose of this shoulder is to facilitate stacking of the container bodies, for transportation. When stacked, the shoulder rests against the upper surface of the connecting wall 52 of the container body beneath it.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

Each feature disclosed in this specification (in-

cluding any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

Claims

1. A container having an upwardly open container body and a lid, the container body having an upwardly open channel around its rim, defined by an inner upright wall, an outer upright wall and a lower connecting wall, the lid having a downwardly depending skirt adapted to locate within the channel wherein, around at least a portion of the channel there is a weak zone by means of which a tamper-evident portion of the outer wall may be broken off or permanently displaced, the skirt then being accessible, and displaceable outwardly, wherein the outer surface of the inner wall of the channel, and the inner surface of the skirt, have co-operating means which prevent the skirt from rising out of the channel, other than when the skirt is accessible following the breaking off or permanent displacement of the tamper-evident portion.
2. A container as claimed in Claim 1, wherein the co-operating means do not extend around the entire rim of the container.
3. A container as claimed in Claim 2, wherein the container has corners and the co-operating means do not extend around the corners.
4. A container as claimed in any preceding claim, wherein the co-operating means suitably comprise inter-engaging step portions formed on the outer surface of the inner wall and the inner surface of the skirt.
5. A container as claimed in Claim 4, wherein at least one of the step portions has a face which is at a slant angle to the inner wall and the skirt, such that the step portion of the skirt can slide over the step portion of the inner wall, to become disengaged therefrom, by upward and outward displacement of the skirt, once it has become accessible, following the breaking off or permanent displacement of the tamper-evident portion.
6. A container as claimed in any preceding claim, wherein the tamper-evident portion extends around only a small proportion of the rim of the container.

7

EP 0 628 492 A1

8

7. A container as claimed in Claim 6, wherein the container has corners and the tamper-evident portion extends around at least one corner.
8. A container as claimed in any preceding claim, wherein the tamper-evident position is adapted to be permanently displaced, not broken off. 5
9. A container substantially as hereinbefore described with reference to the drawings. 10

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EP 0 628 492 A1

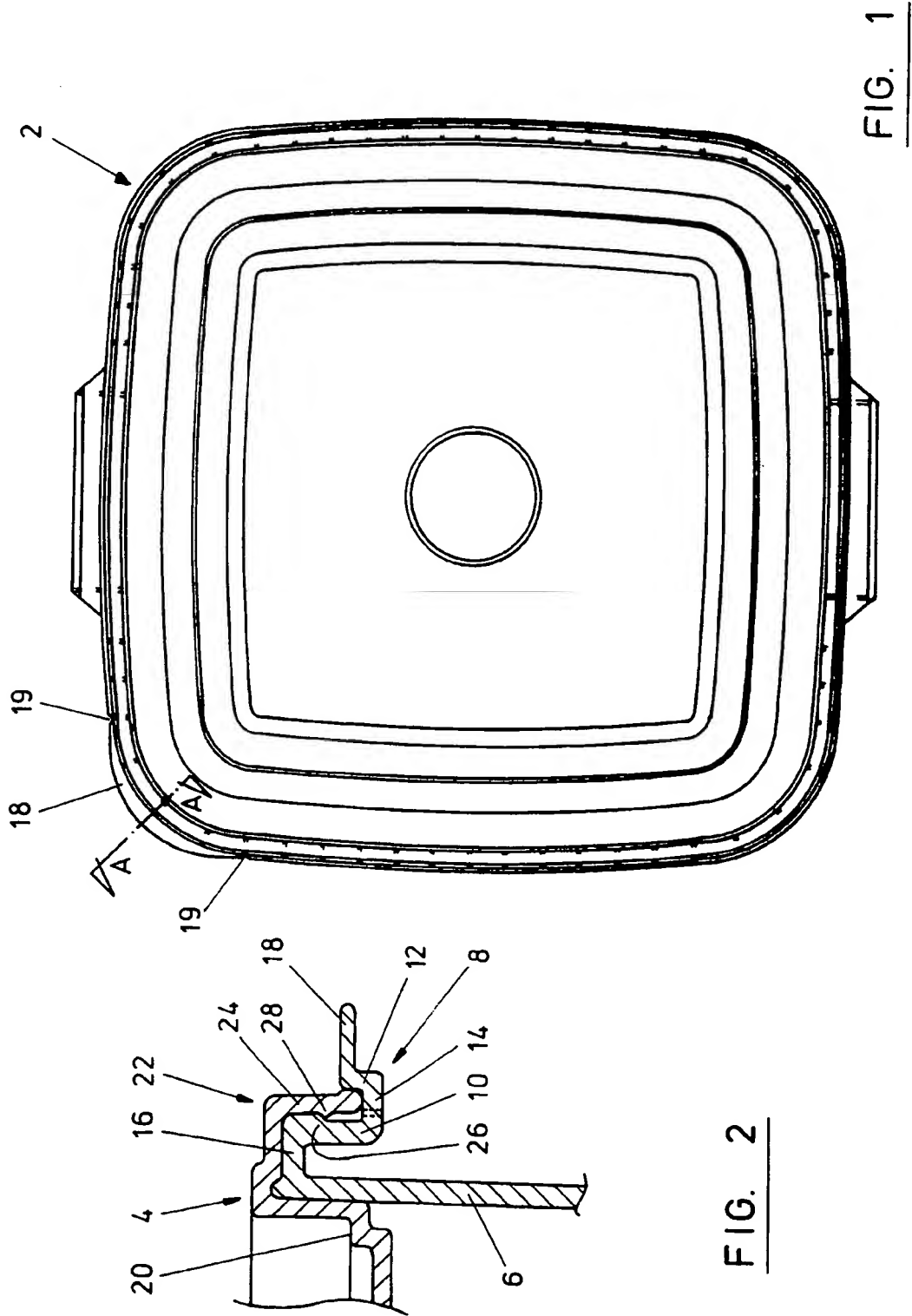
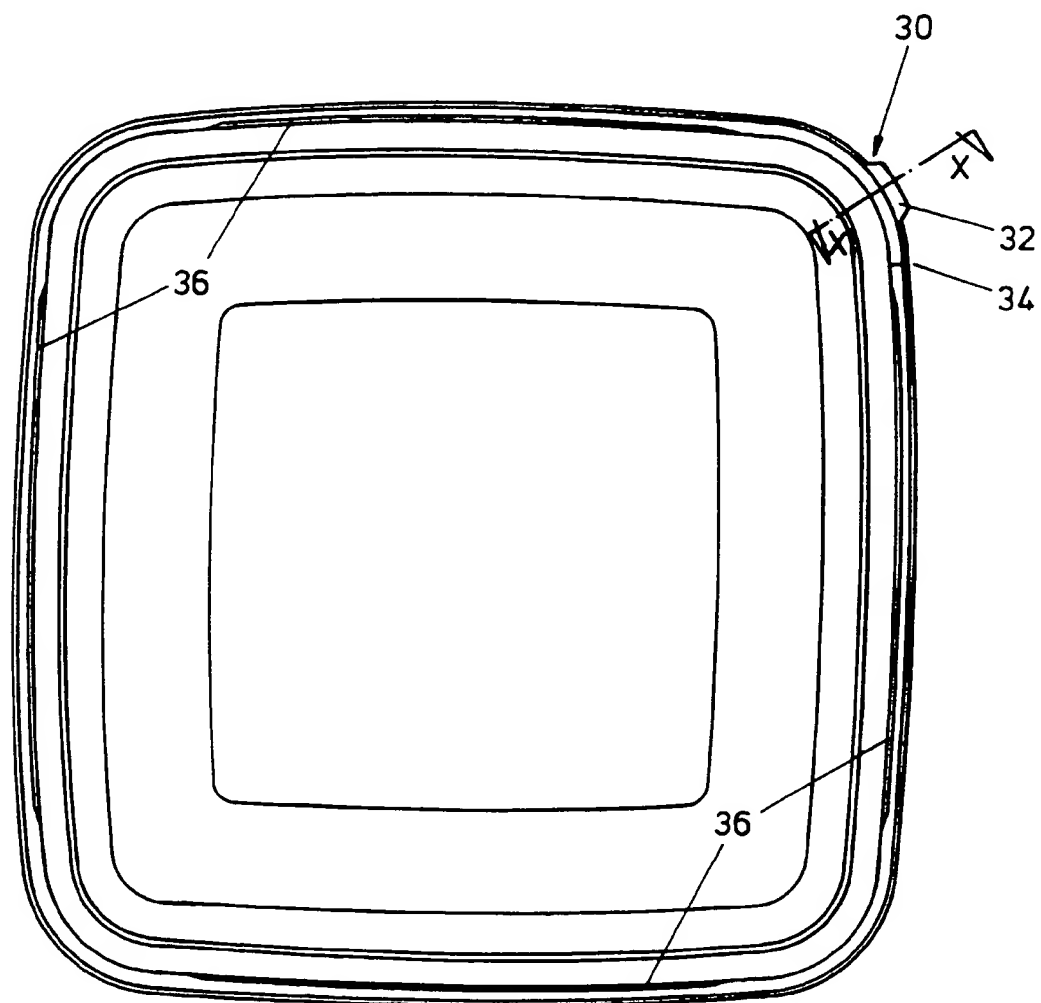


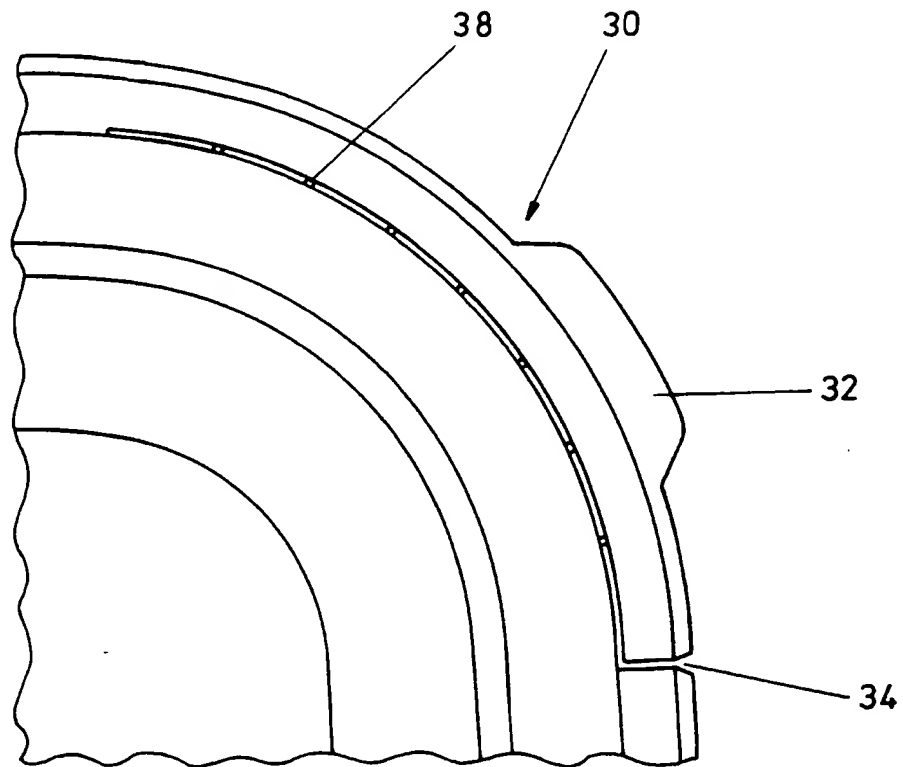
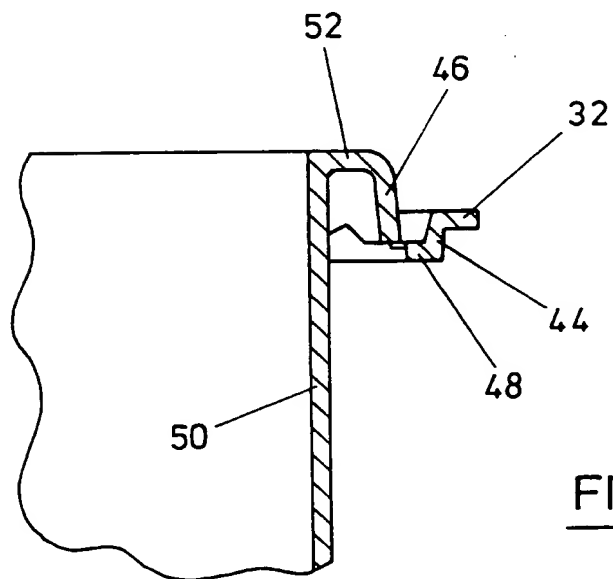
FIG. 1

FIG. 2

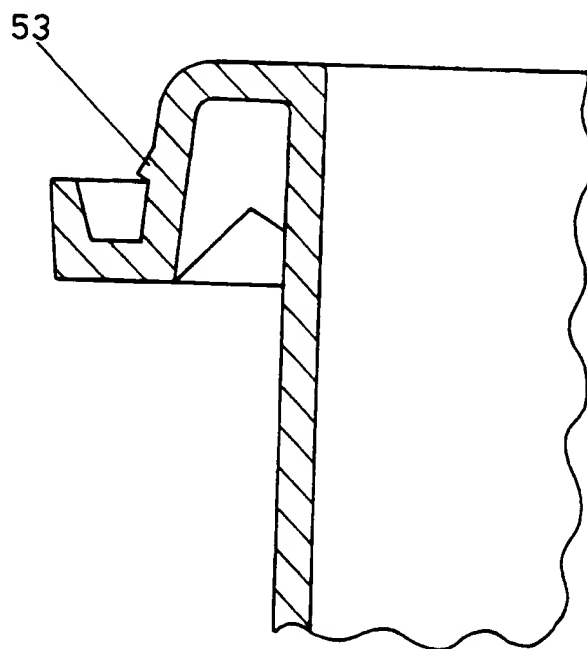
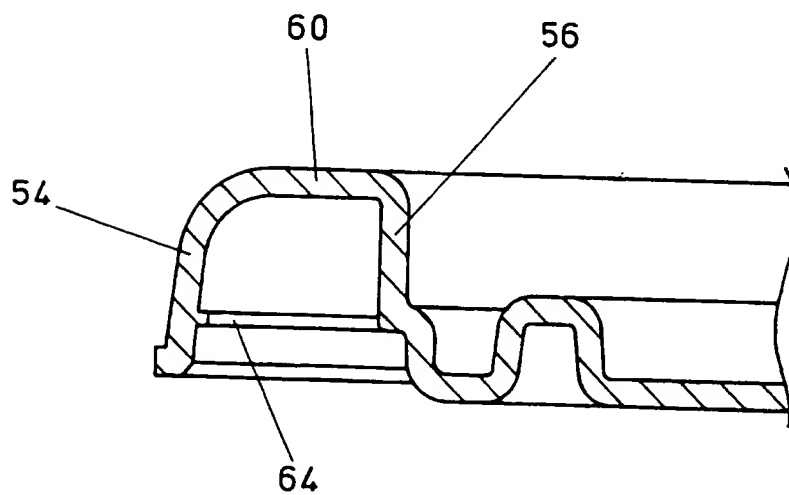
EP 0 628 492 A1

FIG. 3

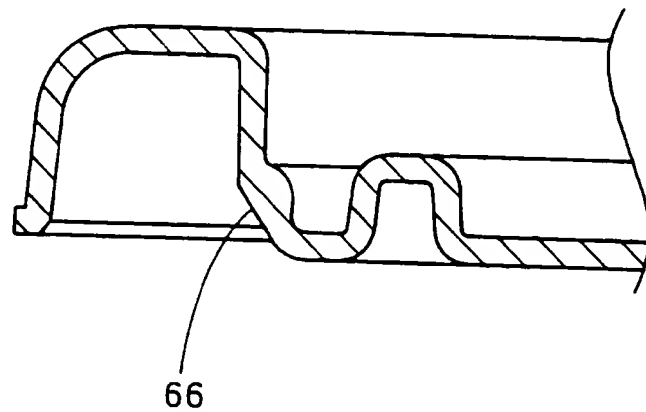
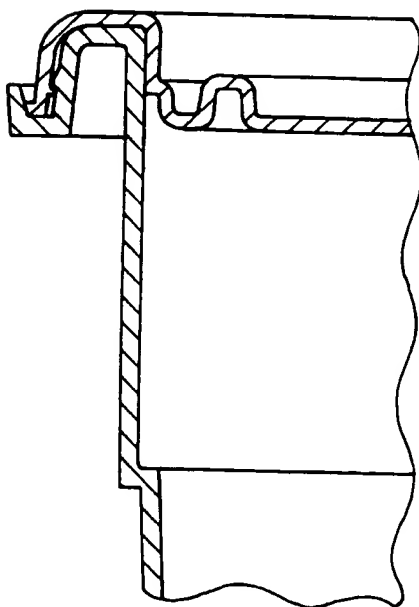
EP 0 628 492 A1

FIG. 4FIG. 5

EP 0 628 492 A1

FIG. 6FIG. 7

EP 0 628 492 A1

FIG. 8FIG. 9

EP 0 628 492 A1



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Application Number

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

EP 94 30 4041

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cls)
X Y	WO-A-93 01984 (CAS SNAP) * abstract; figure 15 *	1,4,5 2,3,6-8	B65D43/06 //B65D101:00
Y	US-A-3 741 433 (R.C.BENTLEY) * column 2, line 28 - line 34; figure 1 *	2,3	
Y	EP-A-0 110 859 (THOVADEC PLASTICS) * page 4, line 20 - line 28; figure 3 *	6-8	
P,X	US-A-5 249 694 (J.L.NELSON) * abstract; figure 4 *	1,4,5	
			TECHNICAL FIELDS SEARCHED (Int.Cls)
			B65D
INCOMPLETE SEARCH			
<p>The Search Division considers that the present European patent application does not comply with the provisions of the European Patent Convention to such an extent that it is not possible to carry out a meaningful search into the state of the art on the basis of some of the claims</p> <p>Claims searched completely:</p> <p>Claims searched incompletely:</p> <p>Claims not searched: 9</p> <p>Reason for the limitation of the search:</p> <p>Rule 29(6) EPC</p>			
Place of search		Date of completion of the search	Examiner
THE HAGUE		23 September 1994	Zanghi, A
CATEGORY OF CITED DOCUMENTS			
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